NIST Meeting Data Collection Project

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for the NIST Gang

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Rich Transcription Workshop

NIST Meeting Data Collection Project

- Goals:
  - Provide rich/diverse pool of audio and video corpora for advanced recognition research
    - multiple sensor types
    - spontaneous interactive speech
    - realistic noise environment and microphone placement
    - varied meeting forums and vocabularies
    - varying number and types of participants
  - Explore research and integration issues
  - Help provide infrastructure for integration and evaluation

www.nist.gov/speech/test_beds/mr_proj

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Meeting Recognition Infrastructure

- Collaborate with the research community
  - Determine commonalities and accommodate differences
- Collect and pool corpora (multi-site)
  - from a variety of meeting spaces, microphones, & domains
- Develop standards to leverage data
  - transcription/annotation specifications
  - shared tools
- Provide infrastructure for evaluation
  - evaluation plans, specifications, and software
  - periodic test and workshop cycles (RT-02)
- Investigate utility to downstream applications
  - piggyback evaluations on retrieval, summarization, etc.

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# NIST Data Collection Laboratory

- Typical meeting space and noise environment
  - equipped with standard meeting equipment
- Instrumented with
  - 200 mics, 5 cameras, synchronized with NIST SmartFlow system across 13 processors
  - processors under floor and in adjacent room
  - several disk arrays handle huge storage requirements
- Monitor workstation in adjoining room
  - operator can start/stop data streams, select video views, audio channels, and manipulate cameras
- Review workstation in adjoining room
  - participants can review meeting recordings and de-select excerpts from public distribution

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NIST Meeting Data Collection Laboratory
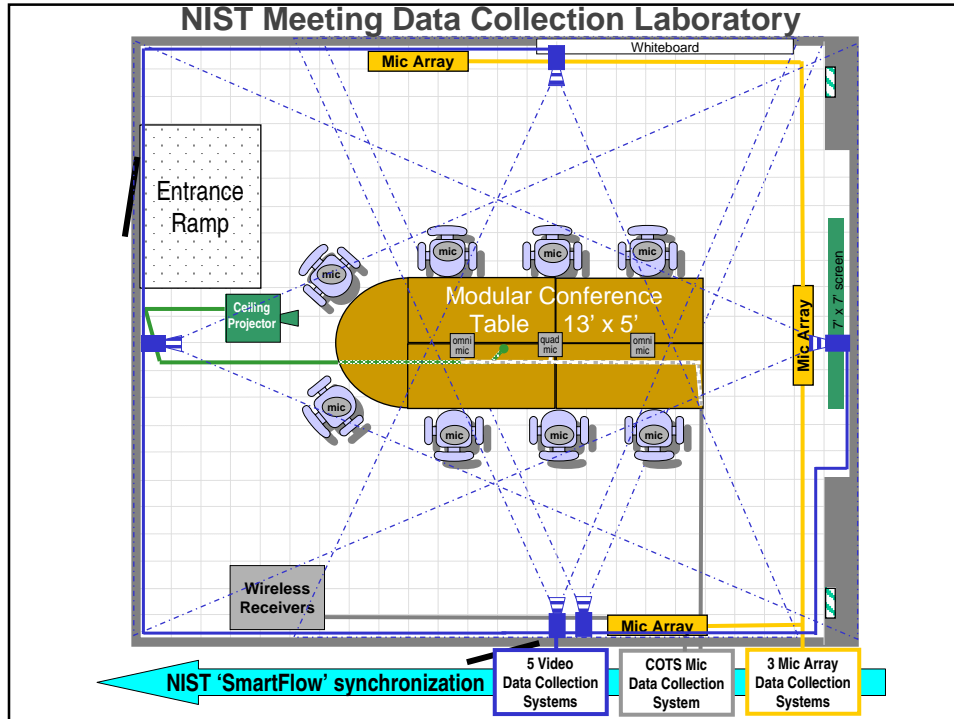
The NIST Smart Flow Interoperability Architecture

- **Large grain data flow System, for distributed sensors**
- **Components, flows, used by name: network, component, transparent**
- **The system handles detail work**
  - **Resource management**
  - **Data pushing**
  - **Flow visualization interface**
  - **Time tags flow buffers**
- **Handles video, audio, vectors, matrices, opaque data capture**
- **Has well-defined, public, interface architecture for component technologies**
- **Integrates Components for**
  - **Speech Recognition – IBM ViaVoice**
  - **Face Recognition – Intel OpenCV**
  - **Microphone Arrays**
  - **High speed data acquisition**
- **Currently handles 200+ sensors generating 1 gigabyte per minute**
- ***Open Source, documentation, downloadable from www.nist.gov/smartspace***
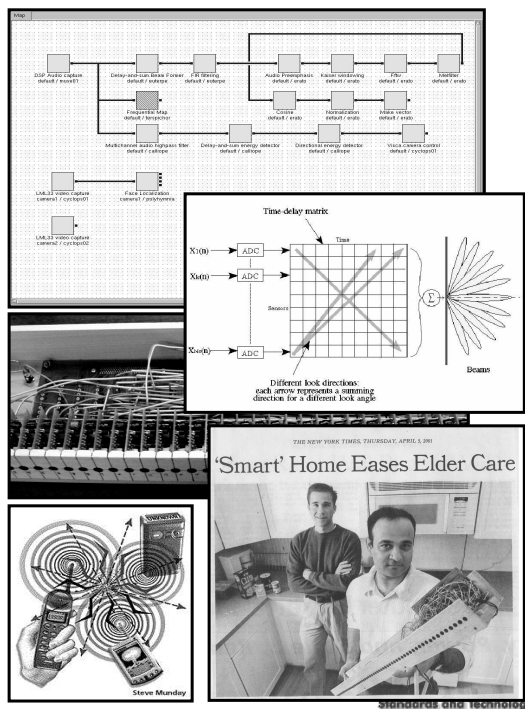
Meeting Review/Monitor Workstation

- Used to both collect and review recordings
- LINUX-based, interfaces with Smartflow live or archived data
- User can select video views and audio channels
- User can control camera view/movement with joystick

Meeting Pilot Corpus Design

- 20 hours of meetings are being collected this year
  - ~60GB per hour uncompressed data rate
  - data stored/distributed on large hard disks
  - will be published via the Linguistic Data Consortium
- Varied forums
  - focus groups, game playing, interacting with experts, real working group meetings, event planning
- Varied meeting lengths
  - 15 minutes to 1 hour
- Varied number of participants
  - 3 to 8 participants

NIST Meeting Scenarios

- Real working group meetings
  - planning, negotiation, brainstorming, decision-making, and dissemination of information
- Real event planning meetings
  - collaborative planning
- Interactive story-telling game
  - competitive performance
- Purchasing a digital camera from the Web
  - collaborative information gathering and decision making
- Office design and furnishing
  - working with a domain expert and decision making
- Focus group discussions
  - technology's effect on your life
  - bioterrorism's effect on your life
  - trading civil liberties for national security
 - life in space -- meet an astronaut
  - our educational system

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Meeting Room Scenario Ontology

Scenario Type	Scenario Example	planning	Negotiation	Brainstorming	Decision making	Competitive performance	Dissemination of Information	Local vs. Remote	Duration (minutes)	Different people	Same people	#of participants	Domain expertise	Org. pre vs. adhoc	Moderator
Focus group discussion	**Round Table discussion**: May include expert to present info and moderate discussion						✖	Local	60	✖	✖	5-8	none	adhoc	✖
Staff meeting	Participants discuss real technical issues, brainstorm ideas and make decisions.	✖	✖	✖	✖		✖	Local	45	✖	✖	5-8		adhoc	
Planning	**Event planning:** Plan the different tasks that each member will carry out, timelines and coordination.	✖						Local	45	✖	✖	5-8	none	adhoc	
Interactive game playing	**Once upon a time:** Participants engage in a storytelling game.					✖		Local	60	✖	✖	3-5	none	pre	
Information exchange and decision making	**Office Furnishing:** An expert will help participants to choose office furniture, carpet, etc. for an office.			✖	✖			Local	45	✖	✖	5-8	none	pre	✖
Information gathering and decision making	**Shop on line:** Participants search the internet and collaborate to purchase a digital camera.		✖		✖		✖	Local	45	✖		3-5	none	adhoc	

NIST Meeting Excerpts

- Two clips:
  - Real working group
    - NIST Visualization Group meeting
  - Group interacting with an expert
    - Optimal office furnishing discussion with office designer
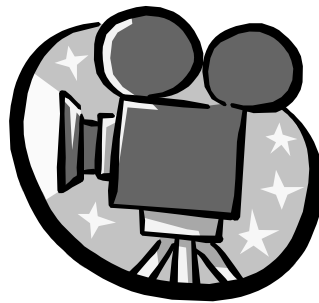
Current Status

- Began data collection in December
  - have collected 10 meetings so far…
- Brought together community:
  - Meeting Transcription Workshop at NIST November 2
  - BBN, CMU, ICSI, JHU, LDC, MITRE, NIST, U-Washington
  - great spirit of collaboration (formats/tools/data sharing)
  - LDC will make multi-site data publicly available
- Performing annotation experiments
  - Sentence annotation DIFFICULT
- Beginning to develop annotation tools
- CMU, ICSI, LDC, NIST meeting data used in RT-02
  - Dev-test and eval-test sets, no training data
  - Diverse test set
  - Too small, but a start

What's Next?

- Continuing development of multi-modal/multi-channel annotation tools
- Considering adding teleconference microphones and making phone-channel recordings
  - collection of multi-site video/teleconferenced meetings
- Replacing array microphones with next-generation models with onboard A/D
- Adding interactive electronic whiteboard
  - will log and timestamp interactions
  - synchronize with audio and video
- Exploring other room sensors/interactive devices
  - e.g., location devices, handheld devices/wireless networks, collect data sent to screen
  - Log and timestamp all data streams

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